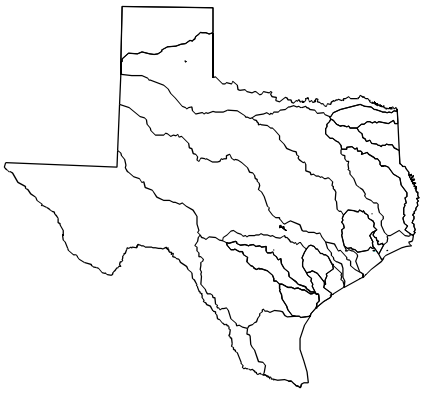
Chapter 2
Core Components of the Watershed Management Approach

The initial watershed management approach for TNRCC operations was designed with five core components based on extensive OWRM planning and the foundation established by existing surface water quality programs and statutes:



- **Geographic units** (river basins and their watersheds) are the spatial basis for coordinating activities.
- **A basin management cycle** coordinates key watershed management activities over time.
- **A statewide basin management schedule** establishes a statewide calendar and sequence for conducting key watershed management activities in each river basin.
- **Total maximum daily loads** are now viewed as watershed action plans that identify responsible parties and specify actions needed to restore and protect water quality.
- **Stakeholder involvement** reflects a concerted effort by the TNRCC to involve stakeholders throughout the watershed management cycle to achieve greater understanding of water quality issues and support for implementing management strategies.

Details on each component and its relation to the overall framework are provided below.

Geographic Units

The TNRCC has historically used river basins and stream segments as the spatial basis for coordinating selected water quality management activities. River basins are the 23 recognized drainage areas for major rivers and coastal areas within the state. "Segment," within the TNRCC, refers to surface waters within an approved planning area exhibiting common biological, chemical, hydrological, natural, and physical characteristics and processes. The state's nine estuarine systems and the extraterritorial waters of the Gulf of Mexico are also identified as stream segments and thus are recognized as planning areas that must be managed (see Figure 2-1). The boundaries of the river basins are hydrologically defined, and because of their use in Texas water resource management, they provide an important precedent in support of a watershed management approach.

Stream segments were established under Texas' water quality standards to facilitate

1. water planning activities;
2. issuing permits;
3. allocating construction grant funds for municipal facilities;
4. supporting other programs necessary for CWA implementation.

Figure 2-1. Geographic Units for the State of Texas

Texas consists of 15 major river basins, 8 coastal basins, 9 estuarine systems, and the extraterritorial waters of the Gulf of Mexico. This comprises approximately 191,228 miles of streams and rivers, and 624 coastline miles. All of these Texas streams drain into the Gulf of Mexico. Of the total stream mileage, 144,507 miles (76%) have intermittent flow during some part of the year, which means these streams have portions that are completely dry some of the time. Texas also has approximately 6,736 reservoirs with a surface area of 10 acres or larger, for a total coverage estimated at 1,065,760 acres.

While river basins and stream segments have been historically used in Texas as the geographic units for water resource planning and management, the TNRCC and other water resource management agencies have identified various limitations in the stream segment system:

1. The historical focus on stream segments has led to a perception of water quality that is restricted to the stream, its bed, and its banks. As a result, the land (or watershed) that drains into each segment is often not considered in water quality management.

2. As the stream segment network has been expanded over time, the delineation of individual segments has not been based on consistent criteria.

3. The spatial resolution of the existing stream segment network is not at a small enough scale to identify and address many water pollution sources.

4. The existing numbering system used for stream segments is inconsistent, and it does not specifically identify and number smaller, unclassified streams.

These limitations have led the TNRCC and other water resource management agencies to consider adopting a more consistent, hydrologically defined geographic unit (i.e., watershed). The readily identifiable boundaries of watersheds provide a functional geographic unit for coordinating management efforts. A common set of geographic units provides standardized means for locating, inventorying, exchanging, and assessing data relevant to basin hydrology and water quality issues. Units of different sizes (e.g., watersheds and river basins) allow for watershed-based activities at different scales. Throughout this document, watersheds are considered hydrologically based subdivisions of each river and coastal basin.

The largest units are the 23 historically recognized drainage areas for the major rivers and coastal basins within the state, the nine estuarine systems, and the extraterritorial waters of the Gulf of Mexico (see Figure 2-1). Key water quality activities such as monitoring, assessment, data management, permitting, and reporting will be coordinated at this large scale. These units are also the basis for CRP coordination. The TNRCC envisions continuing efforts through the CRP to subdivide all basins into smaller geographic units, or watersheds, to be used for more focused data collection, analysis, management strategy development, and implementation activities. Throughout Texas, water resource programs and stakeholders perform water quality planning and management activities at different scales. The use of a common set of defined watersheds within each river basin could greatly enhance opportunities for coordinating, collecting, and sharing water quality data among all stakeholders. This coordination can be enhanced by using geographic information system (GIS) technology, which can scale up or down while maintaining continuity of information. Methods and criteria are currently being developed through a cooperative effort involving the TNRCC, CRP contractors, and the U.S. Geological Survey for defining a compatible set of watersheds for each river basin, as well as procedures for delineating, digitizing, and numbering them.

Basin Management Cycle

Just as the state's river basins and watersheds provide geographic focus for coordination, the basin management cycle provides the focus for scheduling activities and coordinating resources within each watershed. The cycle combines three features into an orderly system for continuously focusing water quality management activities through:

- A phased series of five major watershed management planning and implementation activities (see Figure 2-2),

- Deadlines for each of the activities necessary to achieve a complete iteration of the basin management cycle every five years (see Figure 2-3),

- A sequence and schedule for conducting these activities in all major river basins (see Figure 2-4).

The basin management cycle establishes a rational process for developing and implementing TMDLs, which are now viewed as action plans that specify activities needed to restore and protect water quality standards of individual water bodies.

Phases of the Basin Management Cycle

The basin management cycle has five sequenced activity phases that are repeated for each basin at fixed five-year intervals to ensure that management goals, priorities, and implementation strategies are routinely updated and progressively implemented (see Figure 2-2). Planning and implementation are not one-time activities. The repeating management cycle reflects the TNRCC's understanding that the nature of watershed management is dynamic, and a framework must be flexible enough to address this dynamic nature in an orderly manner over time.

Phase 1: Scoping and Re-evaluation

This phase involves three basic activities: conducting public outreach, identifying priority watershed issues, and planning for coordinated data collection. Public outreach entails communicating with the public to raise awareness of the watershed management process (including the schedule) and building trust through increased opportunities for meaningful input and participation throughout the cycle of activities. To identify issues, interested parties rely on existing assessment reports [CWA §305(b) report, §303(d) list, and CRP assessment reports] to collectively identify local concerns, priority watersheds, and basinwide goals and objectives. The next step is to prepare strategic monitoring plans for coordinated compilation of existing data and collection of additional watershed-specific monitoring data related to priority issues. In subsequent iterations of the cycle, planning may involve re-evaluating previously identified issues and goals to determine their current relevance in light of new information.

Phase 2: Data Collection

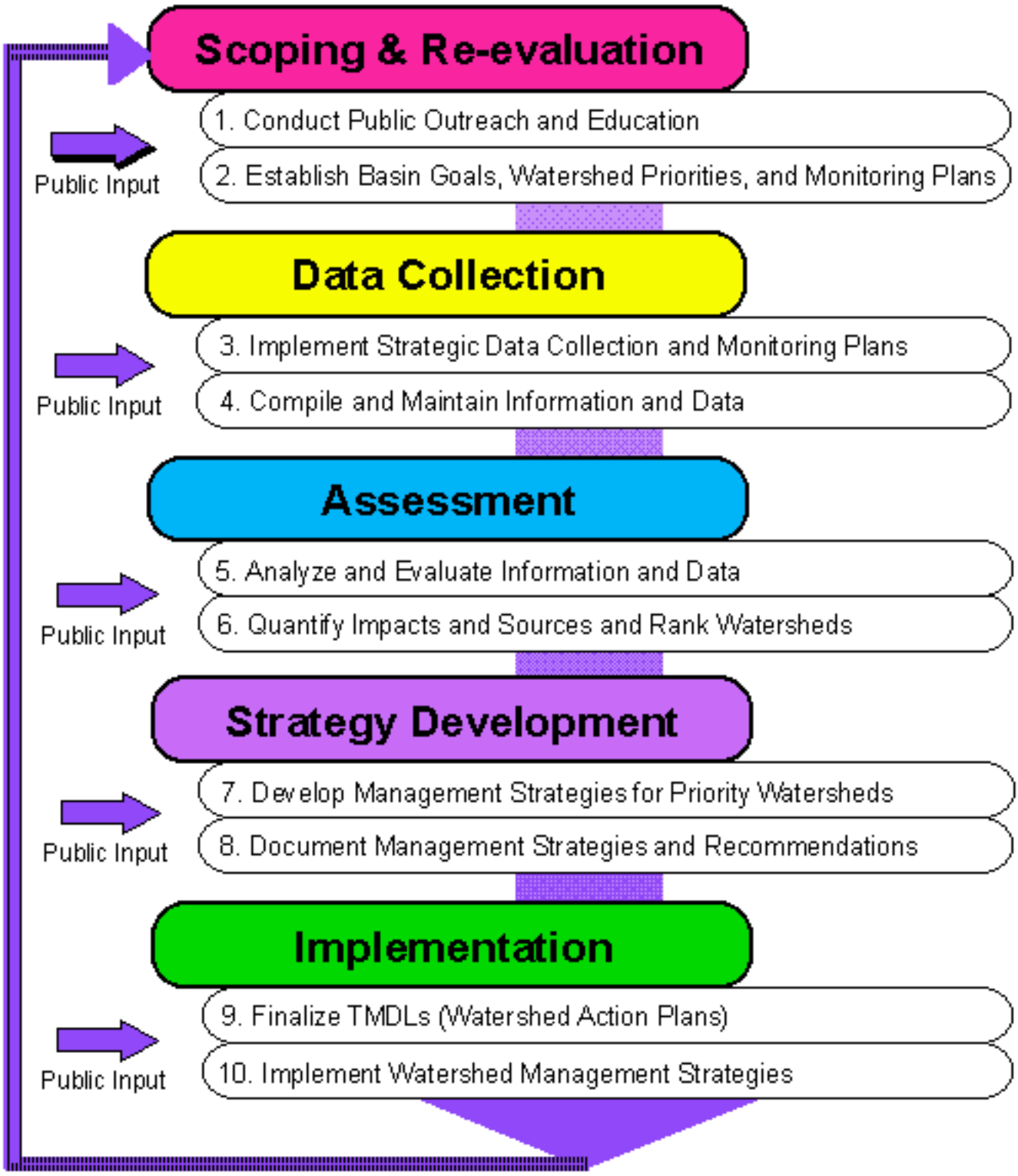
Watershed-based data (e.g., chemical, physical, biological, hydrologic, hydraulic, and land use data) are collected by responsible parties (e.g., private, local, regional, state, and federal organizations) during this phase. Efforts are guided by quality assurance project plans (QAPP). Monitoring plans incorporate three major aspects:

1. *Baseline monitoring* is conducted on every important water body in each basin. This is the traditional monitoring performed continually at key sites on high-profile water bodies regardless of the basin cycle. Data are collected using a monitoring network to adequately characterize water quality trends and monitor progress in protecting or restoring water quality. Monitoring at these important sites may be conducted by the TNRCC or other organizations. The monitoring design will depend on the actual use of the water body and on potential sources of contamination.

2. *Status monitoring* is also conducted on every important water body in each basin. An intense two-year period of status monitoring commences in Phase 1 of the five-year basin management cycle and ends at the beginning of Year 3. In particular, this is the effort necessary to collect data on undesignated water bodies as well as more extensive status and trend analyses of those classified segments not on the 303(d) list. These data are critical for determining compliance with water quality standards and will be primarily used to revise interim updates of the CWA §305(b) Water Quality Inventory Report.

3. *Targeted monitoring* commences at the beginning of Phase 2 of the five-year basin management cycle and ends at the beginning of Year 4. Targeted monitoring focuses on those water bodies identified on the CWA §303(d) list. This monitoring will establish the geographic extent and degree of water quality impairment necessary to apply models for establishing TMDLs, to determine sources of contamination to revise water quality standard, and to support specific wastewater permit limits.

Figure 2-2. Phases of the Basin Management Cycle



Phase 3: Assessment and Targeting

During this phase, quantitative and qualitative analyses of baseline and targeted watershed data are performed by developing and applying tools such as GIS, statistical analysis methods, contaminant fate and transport models, and forecasting models. Information gathered during Phases 1 and 2 for priority watersheds is analyzed to determine appropriateness of water quality standards and to establish load allocations for point and nonpoint sources of pollution. Additional issues identified during assessment are the basis for subsequent assessment reports and revisions to the CWA & 303(d) List.

Phase 4: Strategy Development

In this phase, the TNRCC and technical experts from partner agencies work with other stakeholders to identify, evaluate, and select management strategies that will be effective at achieving pollutant reduction goals for priority watersheds. Focusing on the priority watersheds identified in Phase 1, stakeholders will develop strategies that target actions and financial resources when and where they will have the greatest environmental benefit. Sound science and stakeholder consensus are emphasized to establish cost-effective solutions that are strongly supported by those who must take the actions. Priorities and implementation strategies are documented in draft watershed action plans that outline specific methods and funding sources to serve as a guide for TNRCC programs and partners. Draft action plans are communicated to a broader public audience and fine-tuned as necessary to strengthen public support.

Phase 5: Implementation

During this phase, the TNRCC and other stakeholders carry out management actions in accordance with agreed-upon action plans. For example, TNRCC actions include reclassifying uses for misclassified streams, classifying unclassified streams, revising stream standards (as appropriate), awarding nonpoint source project grants, implementing wastewater pretreatment programs, and issuing wastewater permits. Upon completion of the implementation phase in any given basin, the cycle will begin again with Phase 1 to continue the iterative planning process.

Timing within the Cycle

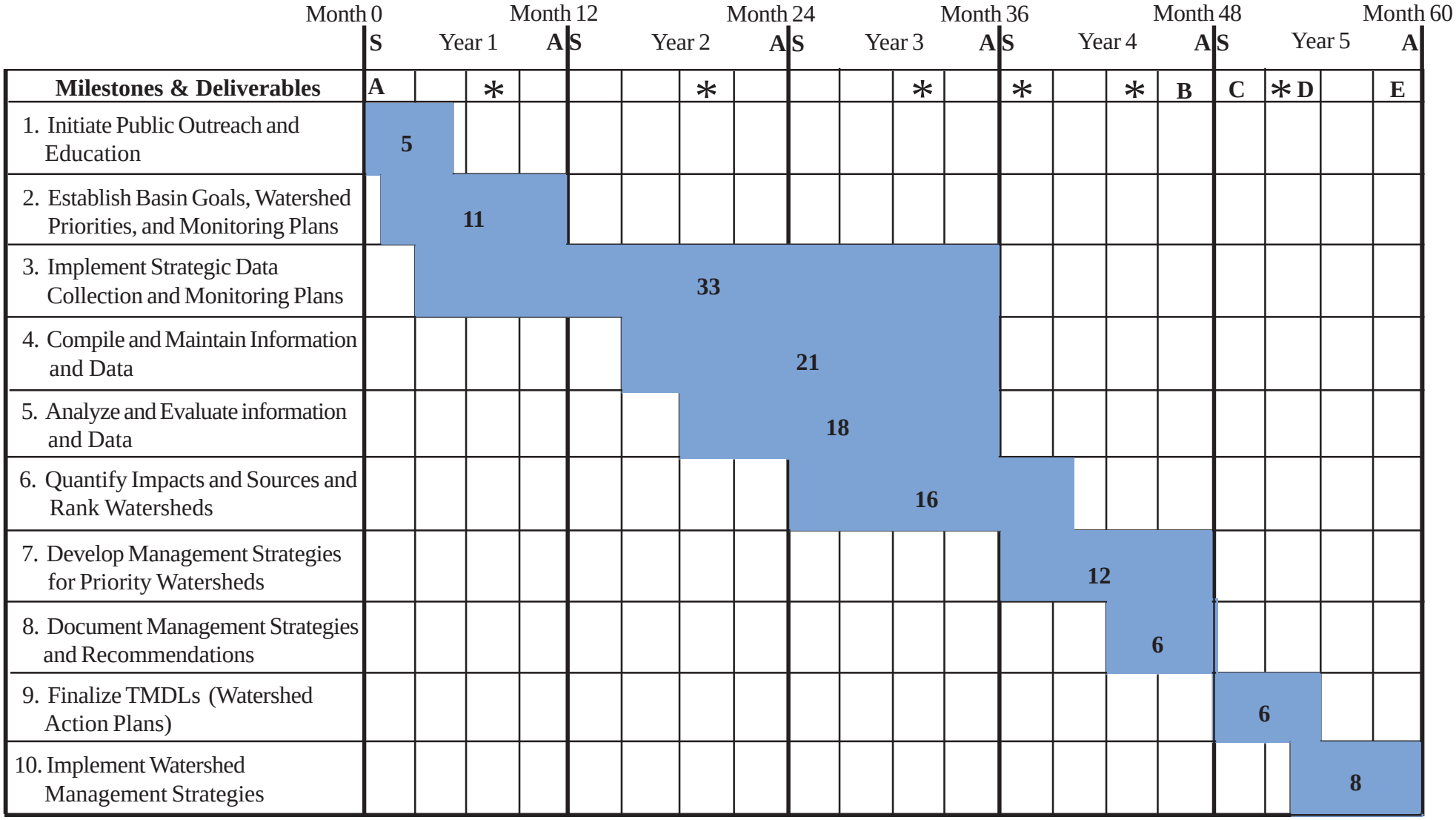
The basin management cycle is comprised of 10 steps organized within the five phases. The phases are the basic tenets of any major planning effort, and they provide a logical framework for coordinating water quality programs.

Figure 2-3 is a time line showing the number of months allocated for each major step in the management cycle of a single basin. The cycle of activities is based on the state's fiscal year, which begins on September 1 (S) and ends on August 31 (A). Public meetings, tasks, and major deliverables are scheduled to ensure that the OWRM and CRP contractors synchronize programs, resources, and outputs with the basin management cycle of individual river basins.

Recommended Time Frames for Input from Key Stakeholders

The basin management cycle will ensure stakeholder participation at critical junctures in the planning process. In the first year of the cycle, public meetings are necessary to establish basin goals, monitoring objectives, and TMDL priorities, and to recruit stakeholders from priority watersheds to participate in the process. In Year 2, the cycle will incorporate public meetings to inform and obtain input from local stakeholders who have been recruited to assist in identifying management strategies for priority watersheds. Once the monitoring and assessment phases are complete, additional public meetings will be held in Year 3 to inform stakeholders in the basin and in priority watersheds of the OWRM's findings. In Year 4, public meetings will be held in priority watersheds to provide stakeholders with the opportunity to play a role in adopting TMDLs and other management strategies for priority watersheds. At the end of the basin management cycle, during the implementation phase, meetings will be held to inform as many interested patries as possible about the watershed management strategies to be implemented and stakeholder roles in implementing them.

Figure 2-3. Time Line for the Basin Management Cycle



Note: Numbers in each block denote approximate number of months allocated for each task.

Key Milestones & Major Deliverables:

* Basin steering commitee meeting to inform and obtain input/recommendations from key stakeholders.
A Statewide Strategic Monitoring Plan - Status and targeted monitoring efforts
B Interim State of Texas Water Quality Inventory Report Update - CWA §305(b) report and CWA §303(d) List
C Interim Nonpoint Source Pollution Statewide Management Plan Report Update - CWA §319
D TMDLs (Watershed Action Plans) for priority watersheds
E Issue domestic and industrial permits

Tasks

Ten major tasks are identified in the five-year cycle, from public outreach to implementation (see Figure 2-3). These water quality management activities will become routine functions in the OWRM over time. The watershed management cycle is an opportunity to coordinate public outreach, surface water quality monitoring, modeling, assessment, standard setting, nonpoint source management projects, and permit activities of each basin in the OWRM, while ensuring stakeholder representation in the process.

Deliverables

Major program outputs are synchronized with appropriate steps in the basin management cycle. Five deliverables are mandated by the CWA: the Nonpoint Source Pollution Statewide Assessment and Management Plan Reports (§319), the State of Texas Water Quality Inventory Reports [§305(b) and §303(d)], and the issuance or renewal of domestic and industrial permits. The TNRCC will work with the EPA to coordinate the due date of these deliverables with the planning cycle. Two other deliverables, the Strategic Monitoring Plan and the Watershed Action Plan, are essential steps in the basin management cycle.

Statewide Basin Management Schedule

The statewide basin management schedule illustrated in Figure 2-4 is designed to accomplish all five phases of watershed management in every basin in Texas, while balancing annual workloads of TNRCC programs and other partners operating statewide. The state's 23 basins, along with its estuaries and extraterritorial waters of the Gulf of Mexico, are assembled into five geographic groups (see Figure 2-5):

- *Group A:* Canadian River; Cypress Creek; Neches River; Red River; Sabine River; Sabine Pass; Sulphur River; and part of the Trinity River (0824–0841)

- *Group B:* Part of the San Jacinto River (1007, 1010–1014, 1017); Trinity River (continued, 0800–0823)

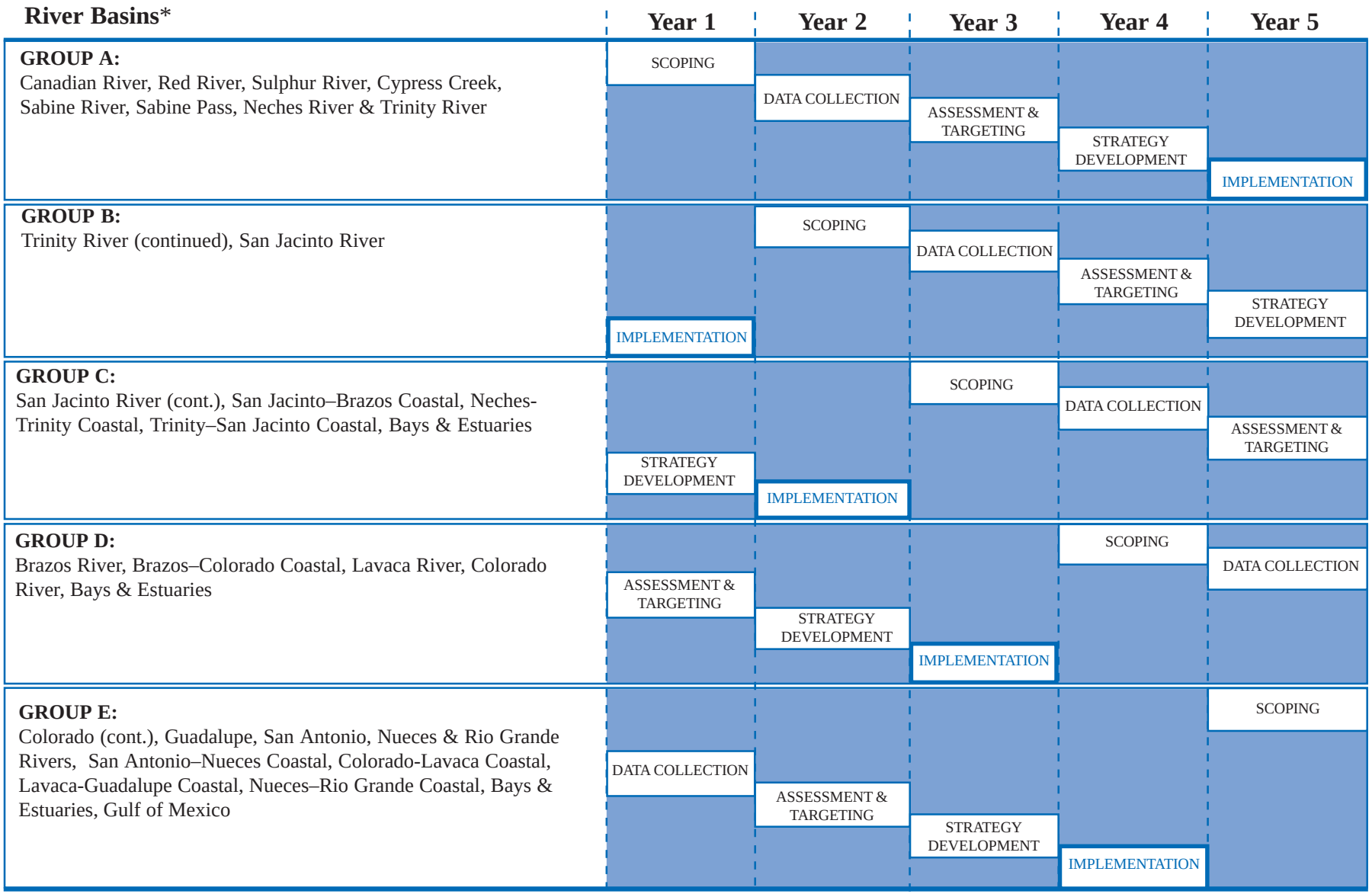
- *Group C:* San Jacinto River (continued, 1000–1006, 1008, 1009, 1015, 1016); Neches-Trinity Coastal; Sabine Lake; East Bay; Trinity Bay; San Jacinto–Brazos Coastal; Trinity–San Jacinto Coastal; Tabbs Bay; Black Duck Bay; Scott Bay; Burnett Bay

- *Group D:* Upper Galveston Bay; West Bay; Clear Lake; San Jacinto Bay; Moses Bay; Chocolate Bay; Bastrop Bay; Christmas Bay; Drum Bay; Barbours Cut; Texas City Ship Channel; Bayport Channel; Lower Galveston Bay; Brazos River; Brazos-Colorado Coastal; part of the Colorado River (1417–1433); Lavaca River; East Matagorda Bay; Cedar Lakes

- *Group E:* Colorado River (continued, 1400–1416); Colorado-Lavaca Coastal; Matagorda Bay; Tres Palacios Bay; Lavaca-Guadalupe Coastal; Guadalupe River; Lavaca Bay; Cox Bay; Keller Bay; Carancahua Bay; San Antonio River; San Antonio–Nueces Coastal; Espiritu Santo Bay; San Antonio Bay; Mesquite Bay; Aransas Bay; Copano Bay; St. Charles Bay; Corpus Christi Bay; Nueces Bay; Redfish Bay; Nueces River; Nueces–Rio Grande Coastal; Corpus Christi Inner Harbor; Oso Bay; Laguna Madre; Baffin Bay; South Bay; Brownsville Ship Channel; Rio Grande; Gulf of Mexico

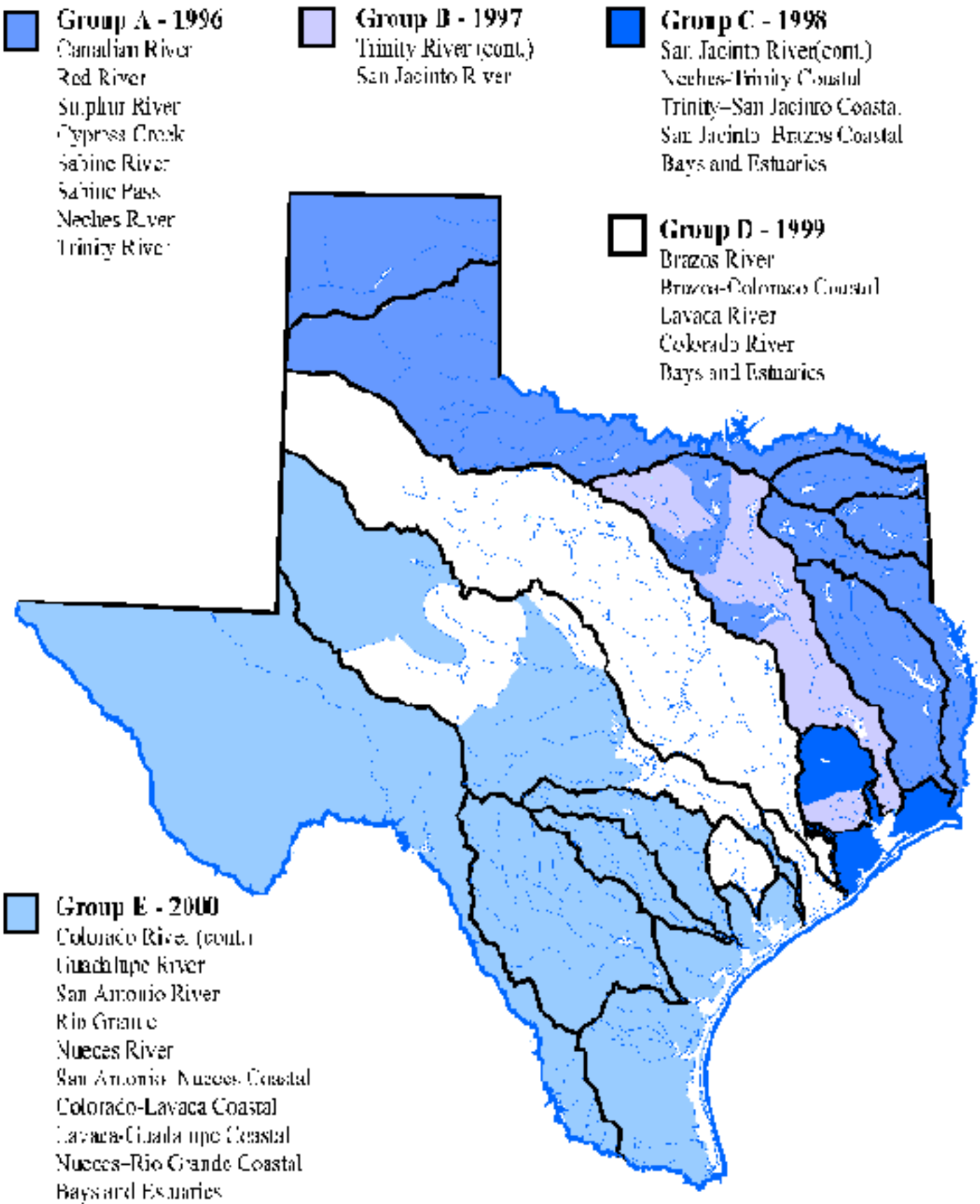
Complete transition to the statewide watershed management cycle will take approximately nine years. Beginning in 1997 with Basin Group A, the TNRCC will phase in the management cycle. Each year, the cycle will be phased in for the next basin group, until all five basin groups have been initiated in 2002. Activities in all five basin groups will continue sequentially in the same order, repeating the cycle every five years.

Figure 2-4. Statewide Basin Management Schedule



*Note: Chronological order of river basins is derived from the Title 30 Texas Administrative Code § 305.71 Permit-by-Basin rule. Wastewater permits for each group of basins are issued to coincide with the implementation phase.

Figure 2-5. TNRCC Permit-by-Basin Approach to Wastewater Permitting



The statewide basin schedule provides TNRCC programs, partners, and other stakeholders with a basis for long-term work planning. All parties at the local, regional, state, and federal level know well in advance when certain activities will occur and can plan accordingly. Therefore, programs will spend less time trying to synchronize schedules on an ad hoc basis each year.

Although some flexibility in meeting schedules may be allowed under certain circumstances, programs need to stay on the statewide basin schedule to maintain the continuity and integrity of the framework. The TNRCC recognizes that circumstances differ in each basin in a given year—for example, weather patterns may delay planned strategic monitoring, complexity may delay development of management strategies for certain issues, or wastewater permits may need to be issued at specified times. If circumstances occur that prevent the collection of all recommended information, the available data will be used to formulate the most complete management strategies possible. Activities not completed and priorities not addressed in one iteration of the cycle can be addressed in the next five-year cycle.

Stakeholder Involvement

The TNRCC is neither entirely nor exclusively responsible for managing water resources or cleaning up the environment; rather, the protection and restoration of water resources and aquatic habitat depend on the collective efforts of citizens, businesses, and governmental agencies. The watershed management approach enables citizens and businesses to collaborate and participate with government by coordinating programs and services that lead to the desired environmental results, and the watershed management approach establishes a more consistent process for coordination between the TNRCC and stakeholders. One of the TNRCC's guiding principles is ensuring meaningful public participation in the agency's decision-making process.

A stakeholder is defined as any entity involved in or affected by watershed management activities within a watershed, including the general public and the regulated community. The term *stakeholder* covers a broad range of people and organizations, and it includes four general categories:

- *Government:* City, county, regional, state, federal, and international governmental agencies
- *Business:* Commercial and industrial firms, utilities, business groups, and trade associations
- *Agriculture:* Corporate and individual farmers and ranchers
- *Public:* Individual citizens, schools and universities, and activist groups (including citizen, environmental, consumer, and community groups)

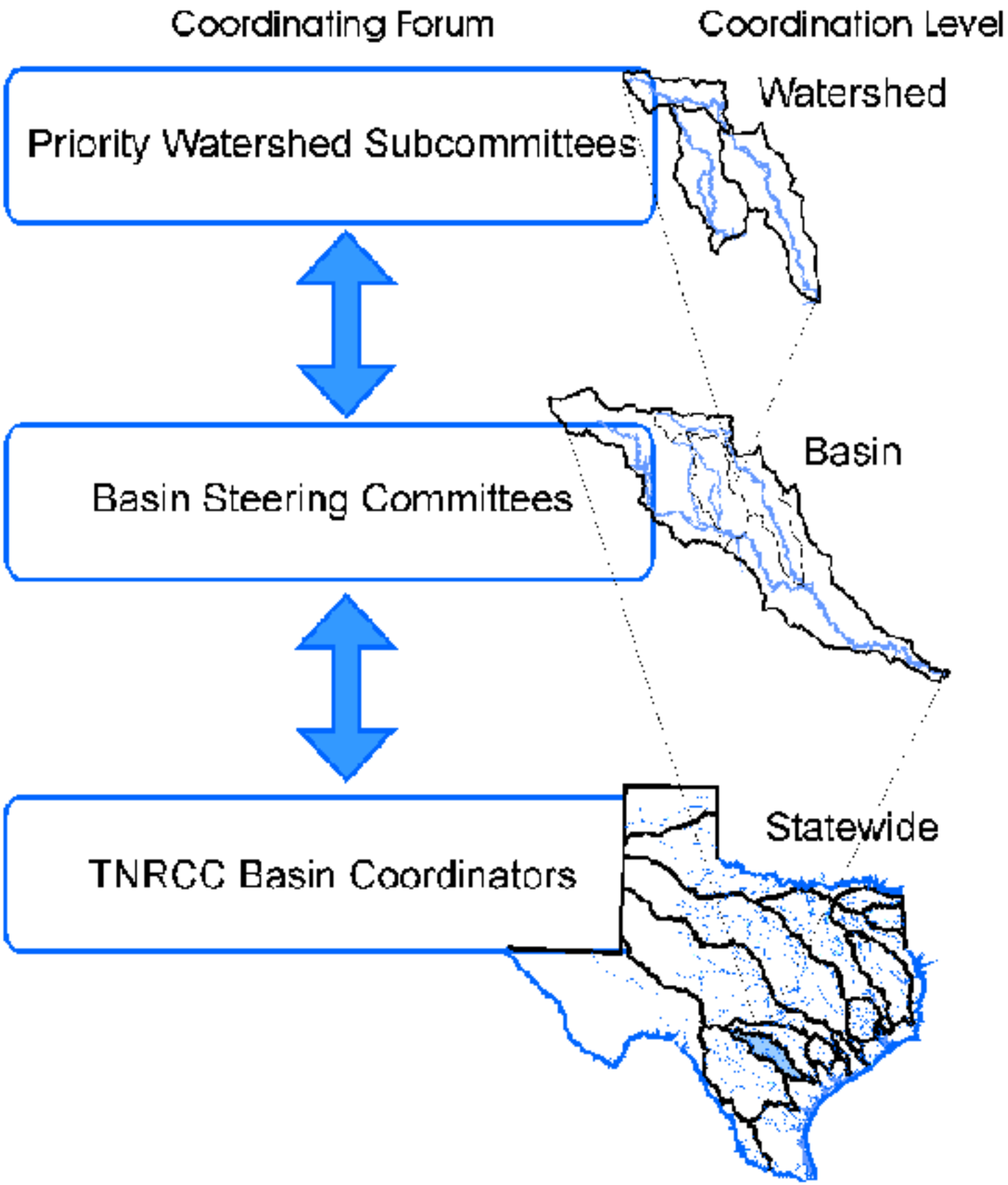
For a representative list of stakeholders, see Appendix A.

The watershed management approach provides additional opportunities for stakeholders to become more aware of water-related issues and participate meaningfully in all phases of the basin management cycle. Outreach and participation increase communication between the TNRCC and watershed stakeholders, often leading to greater trust and interest among parties that are addressing water resource issues. Through partnerships with stakeholders, the TNRCC strives to improve the means to establish goals, identify problems, and implement cost-effective solutions.

Coordination of stakeholders is needed at three levels:

- *Statewide* for agencies and organizations that conduct watershed-management-related activities across the entire state, and therefore need a statewide structure for targeting and synchronizing efforts with one another.

Figure 2-6. Primary Forums for Stakeholder Coordination



- *Basinwide* for assessing water quality conditions within a basin and establishing basin-specific management goals and priorities.

- *Within local watersheds* to rally public support and participation of stakeholders to establish watershed-specific action plans that incorporate nonregulatory and regulatory mechanisms to protect or restore water quality.

The framework includes three separate, but related, coordinating forums to meet these needs (see Figure 2-6). TNRCC basin coordinators will support statewide coordination needs, acting as a point of contact for stakeholders regarding information on the approach and basin management activity schedules, and for compiling key pieces of information for TNRCC basin management documents. Basin steering committees, currently required under the Clean Rivers Program and administered by CRP contractors, provide the primary forum for coordinating stakeholder involvement at the basin level. Priority watershed subcommittees, comprised of key stakeholders from priority watersheds, will provide valuable input about local conditions necessary to design and implement site-specific watershed management strategies. These subcommittees will not be active in all watersheds at the same time because of administrative constraints. Rather, a limited number of subcommittees will be formed during each iteration of the management cycle to focus coordination efforts on priorities identified by the basin steering committee and the TNRCC. The development and functions of these coordinating forums are addressed in greater detail in Chapter 4.

In addition to the primary forums for coordinating stakeholders described above, the TNRCC will continue to use other complementary means of involving and informing stakeholders, including:

- *Texas Watch:* A network of trained volunteers and supportive partners work together in the Texas Watch Program to help the TNRCC protect Texas' natural resources. Texas Watch provides two principal services: providing accurate, useful information to support environmental management decisions, and promoting effective communication with the public about environmental issues. The program supports a wide range of monitoring activities, including a certified water quality monitoring program, educational programs, and nonpoint source pollution projects. Working closely with local citizens, Texas Watch forms watershed-based partnership networks to help volunteers locate resources to perform their monitoring activities. Public and private entities provide funds to help train, equip, manage, and support the growing number of volunteer monitors across the state. Texas Watch has created strong ties between citizens, industries, river authorities, councils of government, water districts, cities, local, state, and federal agencies, students at all grade levels, universities, and private foundations.

- *Public Hearings, Meetings, and Workshops:* The TNRCC conducts public hearings as necessary to evaluate a permit application or an enforcement proceeding. For instance, an individual must apply for TNRCC approval for the use of state water; discharge of wastewater; storage, processing, or disposal of hazardous waste or industrial solid waste; operation of a privately owned and operated public water or sewer utility; and emission of contaminants or odors into the air. If there is a dispute between an applicant and the agency regarding a permit or order, or if one or more persons with legal standing object to the activity under consideration, a public hearing may be held. This is an important formal mechanism for public participation associated with water quality management issues for any watershed within the state. Public meetings are a less formal setting in which the goal is to gather public input on current commission activities such as rule making or permitting. In addition, the TNRCC annually hosts a number of workshops on water resource topics, which provide additional opportunities for public participation and input into the programs, procedures, and management objectives of the TNRCC.

Total Maximum Daily Loads (Watershed Action Plans)

Texas has several methods for providing detailed information about the status of water quality around the state, including the *State of Texas Water Quality Inventory Report*, nonpoint source assessment report, the CRP basin assessment reports, and electronic databases. Although these outputs provide important, scientifically based information, they do not provide solutions to specific water quality issues. Most water quality programs have historically focused on monitoring and

assessment, and marginal emphasis has been placed on documenting consensus-based management strategies for individual watersheds.

The current trend toward a comprehensive interpretation of TMDL requirements under CWA §§303 (d) and (e) is forcing local, regional, state, federal, and international water resource management agencies to consider a much broader approach to point and nonpoint source pollution controls. A total maximum daily load is no longer merely a load allocation number obtained through a water quality modeling exercise. Instead, a TMDL is a process that should culminate in a written, quantitative assessment of water quality problems and contributing sources, and an implementation plan identifying responsible parties and specifying actions needed to restore and protect water quality standards.

In a priority watershed, the TMDL provides a pollutant allocation mechanism that is useful in coordinating local, regional, state, federal, and international actions to restore water quality. Allocations for point source pollutants can be incorporated as pollution limits in enforceable discharge permits. Allocations for nonpoint source pollutants are targets to be met through cooperative agreements and incentives. In outlining appropriate management strategies and objectives, establishing implementation schedules, and identifying potential sources of funding, the TMDL provides critical direction for watershed management at the local and regional levels.

As more emphasis is placed on developing and implementing TMDLs, there will be a growing need to document stakeholder agreements such as pollution reduction goals, pollutant load allocations, management solutions, funding options, and implementation schedules. To meet this need, a general format has been established for documenting TMDLs (or watershed action plans), which will become an output of Phases 4 and 5 of the watershed management approach.

TMDLs will provide critical direction for watershed management at local and regional levels. The purpose of a TMDL is to provide a consistent reference document that presents specific management strategies and corresponding roles for those responsible for implementing water quality restoration and protection measures. TMDLs document sources of water resource impairment, pollutant load allocations, appropriate management strategies and objectives, implementation schedules, and potential funding sources for the management strategies. The level of effort and the extent of documentation necessary for developing a TMDL will vary from watershed to watershed. The primary factors affecting the development of TMDLs include watershed size, model complexity, number and complexity of pollutants, distribution and quantity of point and nonpoint sources, and extent of public participation.

Figure 2-7 outlines key components envisioned for a typical watershed action plan, which will be updated on a five-year rotating schedule for each group of basins. The TNRCC will work closely with the EPA to determine how plans for total maximum daily loads could be used to meet multiple reporting requirements.

While the TNRCC's water resource programs will rely on the watershed action plans when coordinating water quality permitting, monitoring, and assessment activities within the watershed, the document is intended to reach as wide an audience as possible. Thus, another purpose of the plans is to increase general awareness of watershed management among members of the regulated community and the public. A list of expected audiences for watershed action plans is provided below, along with a description of the purposes that a watershed action plan will serve for that audience.

Figure 2-7. Recommended Contents of a Typical Watershed Action Plan

- Watershed name(s), segment number(s), and location(s)
- List of participants involved in the development of the watershed action plan
- General description and geographic display of the priority watershed issues
- Designated use—not supported, partially supported
- Source of impairment—quantify and characterize relative contributions of point and nonpoint source pollution
- Description of existing management activities within the watershed
- Summary of modeling/analysis—recommendations for point and nonpoint source loading reduction goals
- Proposed actions and schedules for implementation:
  - Rationale and detailed information on proposed management solutions (CWA §319 Nonpoint Source Work Plans, Issue Permits), including analysis of alternatives
  - Recommendations for future monitoring (e.g., to clarify causes and sources of impacts and measure effectiveness)
  - Schedule for implementation of regulatory and nonregulatory solutions
  - Specific roles for responsible parties
  - Description of viable funding mechanisms

Audience and Purpose of Watershed Action Plans

TNRCC

Watershed action plans will result in improved program coordination among the TNRCC's water quality management programs, including Water Quality Modeling, Nonpoint Source Program, Surface Water Quality Standards, Toxicity Evaluation, the CRP, and the basin coordinators. The most significant outcome of Phase 4, Strategy Develoment, will be the establishment of point and nonpoint source reduction goals, where appropriate, for priority watersheds. These reduction goals will be the basis for developing management strategies to address known water quality impacts. The plans will detail the implementation responsibilities under the authority of the TNRCC, such as wastewater permits, best management practices for urban nonpoint source pollution, supplemental environmental projects, and revisions to water quality standards. The plans will indicate watersheds that need to be targeted for specific monitoring during the next iteration of the basin management cycle. In addition, they will improve communication and information access and transfer with other TNRCC program areas in the Office of Water Resource Management, the Office of Waste Management, and Pollution Prevention and Recycling.

U.S. Environmental Protection Agency (EPA)

The TNRCC considers the watershed management approach as a rational method for developing total maximum daily loads for priority water bodies as required by the CWA. Consequently, the EPA will be involved in the review of these action plans for their compliance with the CWA. Since TMDLs will aim to incorporate wastewater permit effluent limits, recommendations for new EPA pretreatment programs, CWA §319 work plans, and recommendations for water quality standards, the EPA will rely on these documents to track the TNRCC's progress in meeting various requirements under the CWA.

Clean Rivers Program Contractors

As the Clean Rivers Program exists today, CRP contractors could play an important role in the development and documentation of the watershed action plans. Through coordination with agency staff, CRP contractors will assist in documenting sources of water resource impairment and basin development trends; recommending management alternatives

and objectives; and identifying potential funding sources for management strategies. They will also assist in coordinating input and information from stakeholders which supports strategy development. By focusing on priority issues within priority watersheds, river basin authorities will have an important document for use in developing their long-term plans for allocating financial and staff resources.

Other Federal and State Agencies

Watershed action plans will become a useful method for communicating with other federal and state agencies with responsibilities in water resource management. The plans will inform federal and state agencies about the basin management cycle, which in turn will help the agencies coordinate the regulatory and nonregulatory activities under their authority to support TMDLs and other management activities proposed within priority watersheds.

Local and County Governments

Local and county governments have numerous planning and resource management authorities and responsibilities regarding the use of land and water resources within a watershed. Through Phase 4, Strategy Development, management strategies at the local level may be appropriate. Where statutory authority exists, zoning, subdivision, or water quality protection ordinances may be identified as the most appropriate method for addressing the issues identified in priority watersheds. Wastewater pretreatment programs, pollution prevention, public education and outreach, and training courses are other management strategies that could be incorporated into the watershed action plans.

Legislature

Watershed action plans will provide a consistent method for communicating technical information and administrative needs to the state legislature. In addition to heightening the legislature's awareness of watershed management issues, the plans will help identify environmental problems within individual legislative districts in need of additional appropriations or additional statutory authority to design and enforce solutions.

Regulated Community

Watershed action plans will help educate the regulated community regarding management actions needed to maintain or restore the ecological integrity of the watershed, including reasons for point source effluent limitations and nonpoint source runoff controls. Priority concerns, implementation schedules, and assimilative capacity information contained in plans will provide direction and a basis for making longer-range commitments to environmental protection efforts and encourage voluntary measures for pollution control and compliance. The success of the management strategies proposed in TMDLs will be enhanced by the involvement of regulated entities in priority watersheds.

General Public

Watershed action plans improve public awareness of local water quality issues. This increased awareness helps government agencies garner public support for water quality programs and improves public confidence that resources are being directed to priority environmental issues within their communities. The information in the plans should facilitate stakeholder participation in watershed management and help direct volunteer efforts, such as citizen monitoring and river cleanups, toward useful projects.

Special Interest Groups

Examples of special interest groups include, among others, power utilities, agricultural industries and farmers, and environmental groups. Watershed action plans should raise general awareness of watershed priorities among interest groups, improve perception of environmental management, facilitate participation, and help focus special water quality management efforts put forth by these groups.

Research Institutions

Watershed action plans will eventually include recommendations for additional research and modeling needs that could be met through future cooperative efforts with universities, national laboratories, land grant colleges, and other research institutions. Consequently, research institutions can use the watershed management approach to target their research and technical assistance efforts.